Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	)	
	)	
Amendment of the Commission's Rules to Establish Rules and Policies Pertaining to a Mobile-Satellite Service in the 1610-1626.5 and 2483.5-2500 MHz Frequency Bands	)	CC Docket No. 92-166

OPPOSITION AND COMMENTS
OF
CONSTELLATION COMMUNICATIONS, INC.

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December 20, 1994

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EXECUTIVE SUMMARY

Constellation Communications, by its attorney, files this Opposition and Comments in response to the Petitions for Reconsideration filed by AMSC Subsidiary Corporation ("AMSC"), Loral\Qualcomm Partnership, L.P. ("LQP"), Motorola Satellite Communications, Inc. ("Motorola") and TRW, Inc. ("TRW") of the Commission's Report and Order, in CC Docket No. 92-166.

In this Opposition and Comments, Constellation supports LQP, Motorola and TRW in their request for the Commission to reconsider its decision to provide AMSC the opportunity to utilize the 1.6/2.4 GHz bands. Furthermore, Constellation opposes AMSC's request to access the bands for its domestic GSO MSS system. AMSC fails to demonstrate any significant advantages of GSO MSS satellites over non-GSO satellites and that the Commission was wrong in basing its decision to limit use of these bands to non-GSO systems. Additionally, Constellation believes that AMSC has been provided sufficient spectrum to meet its needs and that AMSC has never demonstrated in a factual and technical manner that the 33 MHz of spectrum already assigned to it, together with the 28 MHz of spectrum permitted under the § 319(d) waiver will be insufficient.

Constellation supports Motorola's approach with regard to replacement satellites. Specifically, Constellation believes that §25.120(e) of the Commission's rules confuse the process of replacing satellites with improved or second generation versions with the normal process of renewing a 10 year license under §307(c) of the Communications Act, and incorrectly assumes in §25.143(c) that all replacement satellites during the license term will be technically identical. Constellation believes that this issue can be resolved by the Commission clarifying its procedures and rules to clearly indicate that (1)

additional "technically identical" satellites can be built and launched to replace failed in-orbit spare or operational satellites without prior Commission authorization, (2) modification applications will be accepted at any time to change the system configuration or individual satellite parameters and reviewed only with respect to the potential for increased interference, and (3) renewal applications for the 10 year blanket system authorization will be filed on the schedule specified by the Commission and will be reviewed only in light of the Commission's policies on renewal expectancy. Furthermore, Constellation opposes LQP's proposal to make the construction milestones more stringent than those contemplated in the Report and Order but agrees with TRW that the Commission should be flexible in applying its milestones during the course of system implementation. With regard to feederlinks, Constellation believes that the LEO MSS applicants who initially proposed to use C-band feederlinks should be given priority in the assignment of C-band feederlink spectrum. Constellation does not agree with TRW that each LEO MSS operator should be guaranteed access to each country on the same terms and conditions.

There are several other issues raised in the Petitions that are important to Constellation. In particular, Constellation supports TRW's request to extend the spectrum sharing plan throughout North America. However, it is opposed to the request of LQP and Motorola to eliminate the interim GLONASS Plan. Furthermore, Constellation remains opposed to Motorola's out-of-band emission mask based on fixed frequency offsets, related to the bandwidth of Motorola's emissions. Finally, Constellation believes that Commission should clarify certain portions of its Service Rules.

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OPPOSITION AND COMMENTS

Constellation Communications, Inc. ("Constellation"), by its attorney, files this Opposition and Comments in response to the Petitions for Reconsideration filed by AMSC Subsidiary Corporation ("AMSC"), Loral/Qualcomm Partnership, L.P. ("LQP"), Motorola Satellite Communications, Inc. ("Motorola") and TRW, Inc. ("TRW") on November 21, 1994 seeking clarification and/or reconsideration of the Commission's Report and Order, FCC 94-261 released October 14, 1994 ("Report and Order") in the matter captioned above.[1]

Constellation is one of the five companies that filed applications for a non-geostationary satellite system in the 1610-1626.5 MHz and 2483.5-2500 MHz bands by the June 3, 1991 cut-off date[2] and has actively participated in this

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[1] Constellation also filed a Petition for Reconsideration in this proceeding on November 21, 1994.

[2] See Application File Nos. 17-DSS-P-91(48) and CSS-91-013, as amended on November 16, 1994.

proceeding.[3]

I. The Commission Should Reconsider Its Qualification Standards and Exclude Existing GSO MSS Licensees From Eligibility To Hold A 1.6/2.4 GHz MSS License

LQP, Motorola, TRW and Constellation in their Petitions all urged the Commission to reconsider its decision to consider authorizing mobile-satellite service ("MSS") satellites using the geostationary satellite orbit ("GSO") to operate in the 1.6/2.4 HGz bands. Specifically, LQP argues that such action would be arbitrary, capricious and inconsistent with the Commission's MSS policies.[4] It further contends that there is no rational basis for this decision in the Report and Order or in the record, and the proposal detracts from the public interest benefits of licensing LEO systems which the Commission claims as justification for its new rules."[5] Motorola believes that AMSC's application should be dismissed for competitive considerations and because its LEO application is inconsistent with its claim for more spectrum for its geostationary system.[6] TRW argues that AMSC should not be permitted to prosecute an amendment to its system in order to

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[3] See e.g., Comments of Constellation Communications, Inc. filed May 5, 1994, and Reply Comments of Constellation filed on June 20, 1994.

[4] See LQP Petition at 3-11.

[5] Id.

[6] See Motorola Petition at 19-23.

maintain its position as an applicant in the current processing group.[7] Constellation supports all of these parties.[8]

Consequently, Constellation opposes AMSC's petition seeking Commission reconsideration to permit it to access the 1610-1626.5 MHz and 2483.5-2500 MHz bands for its domestic GSO MSS system. AMSC fails to demonstrate any significant advantages of GSO MSS satellites over non-GSO satellites and fails to demonstrate that the Commission was wrong in basing its decision to limit use of these bands to non-GSO MSS systems.

Although AMSC identifies seven factors which it claims demonstrate the superiority of GSO MSS systems[9], none are convincing.

(i) AMSC claims that GSO satellites permit satellite power to be directed to areas with the greatest traffic. But this feature is a result of transponder and antenna array design not the orbit. The same capabilities to redirect satellite power to areas with higher traffic exist in LEO MSS systems, such as the one described in Constellation's November 16, 1994 amendment, which utilize active antenna arrays to distribute satellite power among beams.

(ii) With respect to dispatch services, any advantage of GSO MSS over LEO MSS would be derived only from the larger area covered by a GSO satellite antenna beam. But if the area covered by a GSO antenna beam is so much larger than that of a LEO satellite beam, any advantage claimed for dispatch services would be more than negated by the greater spectral inefficiencies in providing the more

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7 See TRW Petition at 5-8.

8 See Constellation Petition at 2-4.

9 See AMSC Petition at 3-4.

dominant two-way MSS services because of the lower amount of frequency re-use resulting from such larger GSO antenna beams.

(iii) Even if GSO systems can provide global service, it is not a "comparative virtue" as claimed by AMSC.

(iv) AMSC is wrong in claiming that GSO and non-GSO systems have equivalent time delays. Time delays are composed of two major elements, the processing time in the vocoder and the path delay. A GSO system will experience roundtrip delays between 239 and 274 milliseconds depending on how far away the user is from the subsatellite point, while a LEO system will experience only 5 to 33 milliseconds delay depending on user position and satellite altitude.[10] This difference is significant. The only way AMSC could make GSO and non-GSO systems have equivalent delays is to assume that the GSO system is using a low latency (i.e. processing delay) transmission technique, such as FM or a high data rate digital transmission technique, while the non-GSO system is using a higher latency vocoder employing high data compression, such as 4,800 bps vocoder. However, this would then be a comparison of transmission techniques not orbital characteristics.

(v) GSO satellites will be capable of providing service to handheld subscriber units only with unrealistically large, unfurlable spacecraft antennas. The typical subscriber unit characteristics proposed in the current generation of LEO applications are those normally associated with handheld units in terms of powers, antenna gains, and dynamic power level control ranges. While AMSC is correct that service to handheld units would be extremely limited from GSO systems, it would not be true in the case of non-GSO systems except to the extent that radiation hazard regulations impose extraordinary power limitations or service is intended to users located inside buildings with high wall attenuation. However, in any event, service to handheld units is not a "comparative virtue" as claimed by AMSC.

(vi) There are no unique shadowing problems associated with LEO systems. A shadowing problem occurs when there is an obstruction

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[10] The longest delay occurs for paths between users at 5° elevation angles and the shortest delays occur for users directly below the satellite. LEO altitudes range from 780 to 2,000 as currently proposed. For the medium altitude orbit proposed by TRW, the delays would range from 69 to 100 seconds.

in the line-of-sight between the user and satellite and the likelihood of such an obstruction occurring increases as the elevation angle of the satellite decreases. In the case of GSO systems, a subscriber has to move in order to overcome a blocked path to the satellite, while in the case of a non-GSO system, a satellite will eventually appear in an unblocked direction. While the blockage statistics for GSO systems serving users located near the equator with constant high elevation angles may be better than those of non-GSO systems using only high inclination orbital planes[11], the situation is reversed for higher latitudes. Thus, any "comparative virtue" in this regard is only a reflection of the geographic latitude of the user rather than a virtue of GSO systems.

(vii) AMSC's claim that non-GSO systems have a greater risk of causing collisions is unwarranted since the non-GSO satellites are phased or separated in altitude to avoid collisions within a system and each system is confined to non-overlapping orbital shells.[12] The problems of avoiding collisions between non-GSO systems using tens of satellites in different orbits should not be any greater than the problem of avoiding collisions between the hundreds of satellites using the GSO.

Thus, AMSC has not shown that GSO-systems offer any of the "comparative virtues" it claims, and the Commission is fully justified in limiting access to the 1610-1626.5 MHz and 2483.5-2500 MHz bands to non-GSO systems.[13]

Having failed to demonstrate any "comparative virtues," AMSC argues that

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[11] Constellation has proposed to operate one of its planes of satellites with a 0° inclination in part to provide improved coverage of low latitude countries near the equator.

[12] The placement of satellites in the elliptical orbits used in the Ellipso system will have to be carefully coordinated with the placement of satellites in the circular orbital shells used by the other LEO applicants to insure that orbital collisions are avoided.

[13] TRW requests the Commission to clarify that any GSO operations in the 1.6/2.4 GHz bands are truly secondary to the non-GSO MSS service, i.e. that any GSO system applicant demonstrate that it will not in any way interfere with or limit the capacity of the primary MSS operations. TRW Petition at 3-4. Such a clarification would not be necessary with respect to AMSC if the Commission finds AMSC ineligible to hold a license in these bands. However, as recognized by TRW, there would be benefit in clarifying the obligations of RDSS service packages on GSO satellites in this regard.

the Commission should "hedge its bets" on non-GSO systems by allowing AMSC access to at least part of the band. The record clearly demonstrates that non-GSO MSS systems will produce substantial public benefits.[14] These benefits are far more extensive than the three factors of novelty, coverage and service to handheld units that AMSC identified from the Report and Order.[15] Moreover, the differences between the inherent global nature of non-GSO system operations and service and national/regional nature of GSO systems, the dynamic coverage capabilities of non-GSO systems, and the ability of even the initial generation of non-GSO systems to provide simple, low power, omnidirectional subscriber units, whether vehicle installed, portable or handheld, is sufficient justification to limit access to the 1610-1626.5 MHz and 2483.5-2500 MHz to non-GSO systems. This is not the case of the Commission "picking technological winners or losers" since the AMSC GSO systems already has access to as much spectrum as the five new non-GSO systems combined.

AMSC's attempt to characterize its proposal for access to the 1.6/2.4 GHz MSS bands as permitting the Commission to "hedge its bets" amounts to no more than an attempt by AMSC to warehouse spectrum, and perhaps in so doing slow down the development of competing MSS systems. The Commission has already

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[14] See e.g. Constellation Comments at 5-12 and Constellation Reply Comments at 5-7.

[15] See AMSC Petition at 8-9.

"hedged its bets" by assigning 33 MHz of MSS spectrum to AMSC on an exclusive basis in the United States. The Commission further "hedged its bets" by granting AMSC a §319(d) waiver to construct its satellites with 28 MHz of additional MSS spectrum without accepting any competing applications to use this spectrum. AMSC has itself "hedged its bets" with its applications to provide one-way services by filing an application for a Digital Audio Radio Satellite Service system and for a second generation system by filing its 2 GHz PCSAT application.

Constellation believes that there are enough hedges to cover all of AMSC's bets without allowing AMSC access to the 1610-1626.5 MHz and 2483.5-2500 MHz band. It is clear from AMSC's petition and November 16, 1994 amendment that it does not really want to build a non-GSO satellite system. AMSC only wants to add additional spectrum to its system without having to comply with the Commission's normal practice of requiring a justification based on actual usage of previously authorized facilities. AMSC has never demonstrated in a factual and technical manner that the 33 MHz of spectrum already assigned to it, together with the 28 MHz of spectrum permitted under the §319(d) waiver will be insufficient. Until AMSC identifies what portion of this spectrum will be denied to it as a result of international coordination agreements, and then demonstrates by detailed technical analysis that the spectrum available to it is insufficient to provide enough capacity for it to be economically viable, it must be presumed that AMSC has sufficient spectrum available for its first generation system without requiring access to the 1610-1626.5 MHz and 2483.5-2500 MHz bands.

AMSC's attempts to confuse its obligations to justify the assignment of additional spectrum by creating uncertainties over the implementation of non-GSO systems[16] should be rejected. For instance, AMSC raises questions of system financing which is necessarily done over a period of time. This is amply demonstrated by AMSC's recent public stock offering several years after receiving Commission authorization. It also raises questions regarding non-GSO systems' acquisition of foreign landing rights. Constellation understands that such rights are inherent in a U.S. company developing a global system but believes that they are clearly achievable as evidenced by the development of separate international fixed satellite systems. Additionally, other risks for non-GSO systems raised by AMSC include the availability of sufficient feeder link spectrum,[17] the desirability of increased 2.4 GHz power flux density ("PFD") limits[18] and concern over competition from Inmarsat and proposed foreign systems.[19] All of these issues are irrelevant to the issue of whether or not AMSC, as an existing Commission licensee, has met its obligation to justify the assignment of additional spectrum to its system. It has not done so and the Commission should exclude

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[16] See AMSC Petition at 10-11.

[17] It should be noted that substantial progress was made on this issue at the recent ITU-R TG 4/5 meeting.

[18] This is not an issue since all of the CDMA non-GSO systems can operate under the current PFD limits.

[19] Of course competition is inherent in a multiple entry, global non-GSO market (though not in the monopolistic, single designated entity domestic market occupied by AMSC) and will have a similar impact on AMSC's access to the spectrum.

AMSC as eligible to hold a 1.6/2.4 GHz MSS license and dismiss its pending application. If the Commission does so there will be no need to address AMSC's request for reconsideration of the Commission's conclusion that six systems can not operate in the 1.6/2.5 GHz bands[20] or to provide further specification as to the rights of applicants who choose to postpone the demonstration of their financial qualification.[21]

II. The Commission Should Clarify Its Space Station Licensing Procedures

A. Replacement Licensing Provisions. LQP requests the Commission to revise §25.120(e) governing licensing of replacement satellites in order to make it more flexible in accommodating improved, second generation satellites.[22] A similar concern is raised by Motorola, but Motorola requests the Commission to clarify that next generation systems could be treated as modifications to the basic system blanket authorization and that such modification applications could be

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[20] See AMSC Petition at 11-13. Constellation does not see the relevance between the question of whether six systems can operate in the band and the Commission's financial qualification standards. The question of how many systems can operate in the band is a complex question which can be answered on the basis of a technical analysis of the parameters of the proposed systems. If AMSC thinks the financial standards are not strict enough, then AMSC should have requested reconsideration of this aspect of the Commission's rules. Moreover, AMSC has not stated how it plans to eventually demonstrate its financial qualifications for a LEO MSS license on a basis other then relying on the balance sheets of its parent companies.

[21] See AMSC Petition at 13-14. As noted in Constellation's Petition at 4 note 10, there is some merit in clarifying the procedures to be applied in the interim period between the issuance of initial authorizations by the planned January 31, 1995 date and the January 31, 1996 date by which pending applications will be dismissed if the qualifications standards are not met.

[22] See LQP Petition at 19-22.

filed at any time.[23]

Constellation shares these concerns[24], but opposes the LQP proposal in favor of the approach taken by Motorola. Constellation believes that §25.120(e) of the Commission's rules confuse the process of replacing satellites with improved or second generation versions with the normal process of renewing a 10 year license under §307(c) of the Communications Act, and incorrectly assumes in §25.143(c) that all replacement satellites during the license term will be technically identical. Constellation believes that this issue can resolved by the Commission clarifying its procedures and rules to clearly indicate that (1) additional "technically identical" satellites can be built and launched to replace failed in-orbit spare or operational satellites without prior Commission authorization, (2) modification applications will be accepted at any time to change the system configuration or individual satellite parameters and reviewed only with respect to the potential for increased interference, and (3) renewal applications for the 10 year blanket system authorization will be filed on the schedule specified by the Commission and will be reviewed only in light of the Commission's policies on renewal expectancy.[25]

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[23] See Motorola Petition at 18-19.

[24] See Constellation Petition at 4-9.

[25] See Report and Order at para. 187.

B. Milestones. LQP requests the Commission to clarify the specific authorization from which implementation milestones are counted and, in particular, proposes that the Commission "require licensees to commence construction (and coordination) as soon as they receive any authorization to commence construction."[26] TRW, on the other hand, proposes that the Commission provide all licensees the opportunity to request postponement of milestones if they are in substantial compliance with the technical qualification requirements of the rules with the satellites already in operation and recertify their commitment to deploy the full constellation.[27] TRW would also have the Commission order a licensee who missed a construction milestone to show cause why it should not forfeit its license rather than have the authorization automatically rendered null and void.[28]

Constellation opposes LQP's proposal to make the construction milestones more stringent than those contemplated in the Report and Order. Because of the uncertainty over which band will ultimately be available for feeder links, the Commission indicated that it would initially grant only "conditional" authorizations, and "unconditional" authorizations would be issued only when

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[26] See LQP Petition at 23.

[27] See TRW Petition at 19-20.

[28] Id. at 20-21.

sufficient domestic allocations for feederlinks to satisfy all LEO MSS systems were available or the World Radio Conference in 1995 ("WRC-95") made sufficient feeder link allocations.[29] However, the Commission clearly indicated that the construction milestones would be measured from the date of the "unconditional" authorization.[30] Constellation fully supports this approach. The choice of frequency band for feeder links has a significant impact on satellite cost, weight and power, and on the overall system architecture.[31] The Commission should not force licensees to expend substantial amounts on satellite construction while such uncertainty exists. Instead, Constellation believes that the Commission has adopted a prudent approach in the Report and Order which allows parties to proceed with satellite construction at their own risk (whether under a §319(d) waiver or a conditional authorization) while the feeder link band availability is uncertain, and imposes strict construction milestones only when this uncertainty is removed.[32] Certainly, nothing precludes LQP or any other applicant from proceeding at their own risk subsequent to receiving a conditional license.

Constellation does agree with TRW that the Commission should be flexible in applying its milestones during the course of system implementation. LEO MSS

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[29] Report and Order at para. 166.

[30] Id. at para. 189.

[31] See e.g. Constellation Comments at 53-59 and Appendix C.

[32] See Note 20 supra.

licensees face unprecedented challenges in having to manufacture and launch a large number of satellites in a relatively short period of time while maintaining a commercially viable enterprise. The Commission should be receptive to proposals to adjust milestones during system implementation in reaction to changes in circumstances. Constellation also agrees with TRW that a licensee should be afforded the opportunity to show cause why an authorization should not be revoked before the Commission declares an authorization null and void for failure to comply with a construction milestone.

C. Feeder Links. TRW states its expectation that it should be provided the opportunity to modify its system to use feeder link spectrum below 15 GHz.[33] Constellation has stated its belief that it can share C-band feeder link spectrum with the other two CDMA systems requesting C-band feeder links provided the necessary coordination was achieved.[34] However, a substantial amount of analysis is still needed to verify this belief in practice and establish the detailed operating parameters needed to limit the interference effects of feeder link antenna beam couplings to acceptable levels. It is not yet clear what the maximum number of LEO systems that can share the same feeder link spectrum. For this reason, Constellation believes that the LEO applicants who initially proposed to use C-band feeder links should be given priority in the assignment of

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[33] See TRW Petition at 16.

[34] See e.g. Constellation Reply Comments at 58.

C-band feeder link spectrum. Hopefully, WRC-95 will identify sufficient feeder link spectrum to satisfy the requirements of all LEO MSS operators and moot TRW's concerns over access to feeder link spectrum below 15 GHz.

D. Exclusive Agreements. Both Motorola[35] and TRW[36] urge the Commission to prohibit LEO MSS from entering into exclusive operating agreements in foreign countries. TRW argues that failure to establish such a prohibition would result in lengthy negotiations and disputes and could potentially limit global competition between LEO MSS systems. Constellation agrees that exclusive agreements which preclude entry into a foreign market by other United States LEO MSS systems should be prohibited. However, Constellation does not agree with TRW that each LEO MSS operator should be guaranteed access to each country on the same terms and conditions. Operating arrangements are likely to be negotiated on a case-by-case basis by each operator in each country and typically with different entities within the country. Depending on the level of investment and the nature of the affiliate, a variety of operating arrangements are likely to develop. The fact that there are different operating arrangements for various U. S. system operators in a country does not necessarily mean there is no competition. It would be impractical for the Commission to extend a prohibition on exclusive operating arrangements that preclude entry by other U.S. LEO MSS

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[35] See Motorola Petition at 16-18.

[36] See TRW Petition at 21-23.

operators to a policy of requiring equality of access for them given the variability of foreign market structures and U.S. LEO MSS operator business plans.

III. Clarification Of Certain Portions Of The Commission's Spectrum Assignment Plan Would Be Desirable

A. Extension of Spectrum Assignment Plan. TRW requests the Commission to specifically commit to undertake coordination efforts to extend the Commission's 1.6/2.4 GHz spectrum assignment plan throughout North America in order to insure that LEO MSS operators can provide meaningful service to all parts of the United States.[37] Constellation agrees with TRW on this point, and expects that the Commission's spectrum assignment plan will form the basis for the international coordination of all of the U.S. systems in the band.

B. Interim Glonass Plan. LQP and Motorola request the Commission to eliminate its proposed interim L-Band assignment plan that would be invoked if the amount of spectrum available to the CDMA operators were reduced in order to protect Glonass operations.[38] While Constellation agrees with many of the points raised by LQP and Motorola, Constellation opposes their proposals to eliminate the plan.

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[37] See TRW Petition at 4-5.

[38] See Report and Order at paras. 49-53.

In particular, Constellation agrees with Motorola that Glonass operations are not now entitled to protection because the Federal Aviation Administration is not planning to use Glonass[39] and with LQP that no interference protection should be afforded to Glonass receivers above 1606 MHz.[40] Constellation can also agree with Motorola's point that the establishment of an out-of-band emission mask would eliminate the need for an interim plan,[41] but disagrees with Motorola's conclusion that there is no need for such a plan now for two reasons. One, such an out-of-band emission mask is not yet available. Two, without knowing what the emission mask is, it is not possible to assess how much L-Band spectrum is impaired by satisfying such a standard. In the same vein, Constellation disagrees with LQP that any interim plan should be deferred until after the establishment of an out-of-band emission mask and receiver filter standards by RTCA[42] since it is not now clear that the result will allow MSS transmissions at the lower edge of the 1610-1626.5 MHz band. Moreover, Constellation does not agree with Motorola that the position of the United States to coordinate only the final Glonass configuration is sufficient to eliminate the

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39 See Motorola Petition at 7-8.

40 See LQP Petition at 15-16.

41 See Motorola Petition at 9-10.

42 See LQP Petition at 17-18.

need for an interim plan.[43] While Constellation would like to believe Motorola's conclusion that MSS operations do not need to be limited in order to protect Glonass receivers, until the Commission actually states that this is the case, an interim plan is necessary to cover the contingency that the Commission may at some date decide to impose operating conditions. Finally, Constellation disagrees with Motorola's contention that the interim plan is inequitable and disproportionately burdens the FDMA/TDMA band segment.[44] Motorola's reliance on the channelization plans of the CDMA operators in assessing relative burden is misplaced since any bandwidth reduction available to CDMA systems will result in increased interference in the remaining CDMA band segment as more users are accommodated in less operating bandwidth and the capacity of each CDMA system falls. In fact, Motorola's assessment that it would lose 24.3% of its capacity if it had to operate with 1.25 MHz less bandwidth shows that the Commission's interim plan disproportionately burdens the CDMA segment. If, as assumed by the Commission[45], the lower 2 MHz were needed as a guardband to protect Glonass, the boundary between the CDMA and the FDMA/TDMA

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[43] See Motorola Petition at 11-12.

[44] Id.

[45] See Report and Order at para 53.

segments would have to be moved by 1.6 MHz[46], rather than 1.25 MHz chosen the Commission, to proportionately distribute the burden between the two segments. Moreover, there is no need to delay the implementation until the second CDMA system is operational as suggested by Motorola.[47] Since there will be at most one LEO MSS system operating in the FDMA/TDMA segment, the unavailability of 24.3% of the segment bandwidth will not harm Motorola since it will be lightly loaded during the early part of the system lifetime and could not fully utilize this spectrum. Under the Commission's milestone structure, the actual number of operating CDMA systems will be known well before the Motorola system is 75.7% loaded and the interim plan can then be adjusted under the actual circumstances then occurring. Thus, there is no adverse impact on Motorola by immediately applying the interim plan.

C. Out-Of-Band Emission Mask. Motorola seeks reconsideration of the Commission's decision not to adopt the out-of-band emission mask advocated by Motorola.[48] In particular, Motorola seeks an out-of-band emission mask to protect its narrow band FDMA/TDMA emissions from CDMA emissions using a fixed frequency offset mask rather than the conventional bandwidth dependent

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[46] E.g., 2 MHz * (4 CDMA systems/5 LEO MSS systems). This value would increase to 1.667 MHz if AMSC were to be authorized in the CDMA segment.

[47] See Motorola Petition at 13.

[48] See Motorola Petition at 15-16.

mask, such as the one currently specified in §25.202(f) of the rules. Constellation opposed this proposal when it was first advanced.[49] Constellation continues to oppose an out-of-band emission mask based on fixed frequency offsets related to the bandwidth of Motorola's emissions.[50] As reflected in §25.202(f), the amount of out-of-band attenuation provided by output filters and the natural emission roll-off of digital transmissions is a function of the occupied bandwidth. For a fixed amount of frequency offset, it will cost more to attenuate a wider bandwidth emission than a narrower bandwidth emission. However, it is the wide band nature of CDMA that allows multiple LEO systems to share the same band and to co-exist with other services. The fact that Motorola has designed its system to use high power density, narrow bandwidth emissions (and thus preclude sharing with other systems and services) should not penalize CDMA operators. Constellation agrees that an out-of-band emission mask for mobile earth station transmitters in the 1610-1626.5 MHz band will eventually be required and that it will be the basis for resolving the various compatibility problems in the band and in adjacent bands. Such an out-of band emission mask must of course be technically and economically feasible. Moreover, the CDMA operators must be allowed to operate up to the edge of the CDMA segment because of the

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[49] See Constellation Reply Comments at 29-30.

[50] Motorola bases its argument in part upon the September 9, 1994 Joint Proposal of Constellation, Mobile Communications Holdings, Inc., Motorola and TRW. However, that Joint Proposal has since been dissolved and is no longer in force.

disproportionate amount of CDMA spectrum[51] and the inter-service sharing impairments that exist in the band. The Commission should therefore reject Motorola's attempts to place further burdens on the CDMA operators in order to resolve the problems resulting from Motorola's own choice of transmission design parameters.

IV. Clarification Of Certain Portions Of The Commission's Service Rules Would Be Desirable

A. Interservice Sharing Criteria. TRW requests the Commission to clarify that it would resolve disputes between LEO MSS operators and the Electromagnetic Spectrum Management Unit of the National Sciences Foundation concerning beacon-activated protection zones around radio astronomy sites[52] and that the out-of-band emission level be specified in terms of a 1 MHz bandwidth.[53] Constellation supports TRW on the first of its points. However, with respect to the protection of radio astronomy sites from out-of band emissions, Constellation requested reconsideration of §25.213(a)(1)(iii) on the grounds that it appeared to offer greater protection to radio astronomy than that

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[51] Motorola is assigned 31% of the band on an exclusive basis and each of the four or five CDMA operators would have 17% or 14% of the band if the shared CDMA portion of the band were assigned proportionally to each operator.

[52] See TRW Petition at 9-10.

[53] See Id. at 11-12.

intended by RR 344 and that the Commission had not adequately considered the impact on MSS operations resulting from this rule.[54] Without agreeing to the specific values proposed, Constellation can support TRW's proposal that any protection criteria be expressed in terms of a 1 MHz bandwidth.

TRW also requests the Commission to confirm the MSS LEO systems that comply with the e.i.r.p. density limits of RR 731 will not be required to provide any additional interference protection to stations operating under RR 730 and RR 732.[55] Constellation supports this request, and urges the Commission to adopt its proposed revisions of §§25.213(c) and (d) which would clearly establish this result.[56]

TRW requests the Commission to clarify that it would grant waivers of the RR 2566 power flux density limit prior to any changes in the international Radio Regulations, and to continue to work to establish coordination threshold.[57] Constellation supports TRW in this regard. However, it should be noted that inter-system coordination agreements may reduce the utility of increased power flux density limits at elevation angles above 25° since the maximum operating

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[54] See Constellation Petition at 13-14.

[55] See TRW Petition at 12-13.

[56] See Constellation Petition at 14-17.

[57] See TRW Petition at 13-14.